REMARKS/ARGUMENTS

In view of the foregoing amendments and the following remarks, the applicants respectfully submit that the pending claims are not anticipated under 35 U.S.C. § 102 and are not rendered obvious under 35 U.S.C. § 103. Accordingly, it is believed that this application is in condition for allowance. **If, however, the Examiner believes that there are any unresolved issues, or believes that some or all of the claims are not in condition for allowance, the applicant respectfully requests that the Examiner contact the undersigned to schedule a telephone Examiner Interview before any further actions on the merits.**

The applicant will now address each of the issues raised in the outstanding Office Action.

Rejections under 35 U.S.C. § 102

Claims 1, 3-8, 10 and 29 stand rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 6,049,524 ("the Fukushima patent"). The applicants respectfully request that the Examiner reconsider and withdraw this ground of rejection in view of the following.

Before discussing patentable features of the claimed invention, the Fukushima patent is introduced. Referring to Figure 2, the Fukushima patent concerns a so-called multiplex router having two routing calculation units (RCUs) 11a and 11b, and one or more forwarding process units 13. The Fukushima patent aims to both (1) prevent

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interruption of packet forwarding and (2) reduce the amount of information transmitted from an active RCU to one or more standby RCUs. (See, e.g., column 3, lines 49-55.) The Fukushima patent purports to achieve this goal by having the active RCU send only network link-state information (not neighboring router states and interface states) to the standby RCU. (See, e.g., column 4, lines 9-44.) As can be seen from Figure 2, an active RCU 11a stores various routing protocol information 21 including link state database information (LSDB) 22, interface state information 23, and neighboring router state information 24. On the other hand, a standby RCU 11b stores only LSDB 22.

As is clear from Figures 9-11 and the associated portions of the specification from column 10, line 30 through column 11, line 15, the active RCU only passes changes in its LSDB 22 to the standby RCU. More specifically, Figure 9 shows the procedure of the process steps of the protocol information manager module 15 in the active RCU. ***The protocol information manager module 15 receives information from the RP packet transmission-reception module 14, and checks if information received is network link-state information (step 131). If the information is network link-state information, the module 15 checks if the information received agrees with the contents of the link-state data base 22 (step 133). If agreement is confirmed, it is <u>not</u> necessary to update the link-state data base 22.*** If they disagree, in other words, if it is necessary to update or delete existing information or add new information, the module 14 updates the link-state data base 22 (step 134). Then, the module 14 sends notification that the network

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link-state data base 22 has been updated and the contents of update to the data base integration module 17 and the routing table calculation module 16 (step 135).

Figure 10 shows the procedure of the process steps by data base integration module 17 on receiving notification of update of the link-state data base 22. When the data base integration module 17 receives update information (step 141), if its RCU is active (step 142), the data base integration module 17 sends notification that the link-state data base 22 has been updated and the contents of update to the standby RCU 11.

Figure 11 shows the procedure of the process steps by the data base integration module 17 in the standby mode RCU when the module 17 receives notification of update of network link-state information from the active RCU. In this process, the data base integration module 17 receives notification of update and obtains update information (step 151). The module 17 checks if update information agrees with the contents of the link-state data base 22 retained (step 152). If agreement is confirmed, it is not necessary to update the link-state data base 22, and therefore the process is terminated. If they disagree, in other words, if existing information is updated or deleted or new information is added, the module 17 updates the link-state data base 22 (step 153). The module 17 then sends update notification that the link-state data base 22 has been updated and the contents of update to the routing table calculation module 16 (step 154), and closes the process.

As can be appreciated from the foregoing, in the Fukushima patent, the active RCU does <u>not</u> provide a ***copy*** of network state information ***received by*** the active RCU

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to the standby RCU. Rather, ***it only sends changes to its link state database 22***.

Independent claim 1, as amended, is not anticipated by the Fukushima patent because the Fukushima patent does not teach providing a *copy* of network state information *received by* a designated routing facility to a standby routing facility ***wherein the act of providing a copy of network state information is performed regardless of a state of network topology information generated by the designated routing facility.***

In the final Office Action, the Examiner argues that passing the changes to the LSDB reads on the claimed copy of network state information. (See Paper No. 20060522, page 13.) Although the applicant disagrees that this teaches providing a ***copy*** of network state information ***received by the designated routing facility***, claim 1, as amended, now recites that the act of ***providing a copy of network state information is performed regardless of a state of network topology information generated by the designated routing facility***. This distinguishes the claimed invention over even the Examiner's interpretation of the Fukushima patent.

Thus, independent claim 1, as amended, is not anticipated by the Fukushima patent for at least the foregoing reasons. Since claims 2, 3, 5, 7 and 10 depend, either directly or indirectly from claim 1, these claims are similarly not anticipated by the Fukushima patent.

Regarding independent claim 4, in the Fukushima patent, the active RCU does not providing a copy of such information (or even link state information) to the standby RCU ***by flooding such information onto a local***

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area network within the router. Thus, independent claim 4 is not anticipated by the Fukushima patent because the Fukushima patent does not teach providing a copy of such information (or even link state information) to the standby RCU by flooding such information onto a local area network within the router. The Examiner argues that sending updates to a standby routing unit over an internal bus 12 teaches flooding a copy of received network topology information over a LAN. (See Paper No. 20060522, page 3.) The applicants respectfully disagree.

Sending information over an internal bus does not teach flooding over an internal LAN. "Flooding" has a particular meaning to one skilled in the art (See, e.g., Andrew S. Tanenbaum, Computer Networks, Third Ed., (Prentice Hall, 1996) p. 351, copy filed herewith.) which is not taught by sending information over an internal bus. Therefore, independent claim 4 is not rendered obvious by the Fukushima patent for at least the foregoing reason.

Finally, independent claim 8 has been amended to recite that the standby routing facility executes a routing protocol based on the network information provided by the designated routing facility ***to generate network topology information***. This is different from the Fukushima patent in which network topology information is determined ***by the active routing unit***, not the standby routing unit. Specifically, in the Fukushima patent, the active routing unit sends updates to network topology information to the standby routing unit. Thus, the standby routing unit does not ***execute a routing protocol based on the network information provided by the designated routing facility to generate network topology***

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information as claimed. Consequently, claim 8, as amended, is not anticipated by the Fukushima patent for at least this reason.

Rejections under 35 U.S.C. § 103

Claim 2 stands rejected under 35 U.S.C. § 103 as being unpatentable over the Fukushima patent in view of U.S. Published Patent Application No. 2002/0021675 ("the Feldmann publication"). The applicants respectfully request that the Examiner reconsider and withdraw this ground of rejection in view of the following.

The Examiner relies on the Feldmann publication as teaching the intradomain protocol IS-IS. (See Paper No. 10042005, page 5.) Even assuming, arguendo, that this is true, and further assuming, arguendo, that one skilled in the art would have been motivated to combine these references as proposed, the combination still does not compensate for the deficiencies of the Fukushima patent with respect to claim 1, discussed above. Accordingly, claim 2 is not rendered obvious by the Fukushima patent and the Feldmann publication for at least this reason.

Claims 11-13, 15-19, 20-28 and 30 stand rejected under 35 U.S.C. § 103 as being unpatentable over the Fukushima patent in view of U.S. Patent No. 6,347,085 ("the Kelly patent"). The applicants respectfully request that the Examiner reconsider and withdraw this ground of rejection in view of the following.

Before addressing this rejection, further aspects of the Fukushima patent are introduced. The Kelly patent is also introduced.

In the Fukushima patent, the multiplex router has a single IP address shared by the multiple RCUs. (See, e.g., Figure 3.) ***Only the routing protocol (RP) transmission-reception module 14 of a currently active RCU*** provides network information to external nodes. (See, e.g., steps 105 and 107 of Figure 6 and steps 114 and 115 of Figure 7. A standby RCU only transmits network information to external nodes (e.g., by starting its RP transmission-reception module 14) when it enters the active mode. Thus, an RCU currently in the standby mode does not transmit such information.

Further, since the multiplex router has a single IP address shared by the multiple RCUs, since the multiple RCUs have synchronized link state information, and since the multiple RCUs independently run their routing algorithms on the synchronized link state information, the external routers 30 need not know the fact that the multiplex router has more than one RCU, nor do the external routers 30 need to know which of the RCUs is active and which is standby. This can be inferred from the operations described by the Fukushima patent, and is suggested by column 8, lines 14-20 which state:

> Because the other routers 30 that received Hello packets from the route calculation unit 11b are periodically receiving Hello packets from the multiplex router 10, ***the other routers 30 do not regard the multiplex router 10 as having run into a failure nor do they rewrite the routing tables they hold***, even if the ID list of other routers included in received packets is incomplete. [Emphasis added.]

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The Kelly patent concerns gateways between telephone (PSTN) networks and Internet protocol (IP) networks, as well as address (e.g., telephone number, IP domain) resolution. Although it mentions the possibility of providing redundant alternative equipment, as well as listing such redundant equipment and instructing when to use such redundant alternative equipment, it has nothing to do with redundant route calculating units in a given router. Thus, as discussed below, one skilled in the art would not have been motivated to combine the Fukushima and Kelly patents as proposed by the Examiner.

First, independent claims 11, 16, 18, 19 and 28 are not rendered obvious by the Fukushima and Kelly patents because the proposed combination of these patents neither teaches, nor suggests, an act of (or means for) informing an external node 30 that a router has redundant routing facilities. The Examiner cites column 5, lines 40-49 as teaching this feature since it says that the router 10 with the two RCUs 11a and 11b is referred to as a "multiplex router device" to distinguish it from other routers. The applicants respectfully submit that the cited section is merely an introductory portion intending to help a reader of the patent specification to understand the invention in the Fukushima patent, and was not discussed in the context of information communicated from the multiplex router device to other nodes 30. Thus, independent claims 11, 16, 18, 19 and 28 are not rendered obvious by the Fukushima and Kelly patents for at least this reason. Since claims 12, 13 and 15 depend from claim 11, and since claims 17 and 30 depend from claim 16, these claims are similarly not rendered obvious.

Second, independent claims 11, 16, 18, 19, 20, 24 and 28, as amended, are not rendered obvious by the Fukushima and Kelly patents because the proposed combination of these patents neither teaches, nor suggests, an act of (or means for) providing, with a current standby routing facility, network information to the external node, or receiving such information by the external node. The Examiner contends that column 7, lines 39-52 of the Fukushima patent teaches this feature. Specifically, the Examiner asserts:

> ***After switchover***, route calculation unit 11b exchanges routing protocol packets with routers 30 and sends a routing table to routers 30 through forwarding process units 13. [Emphasis added.]

Paper No. 10042005, page 6. The Examiner repeats this line of argument in the final Office Action. (See Paper No. 20060522, page 14.) However, after switchover, the former standby RCU is now the active RCU. (See, e.g., column 7, lines 46-49, as well as Figure 7, where 115 follows 114.) That is, after switchover, the standby RCU is active RCU and is not in a state of being a standby RCU.

Independent claims 11, 16, 18, 20 and 24 are amended to more clearly recite the ***state*** of the standby and active RCUs ***when*** they perform certain acts. Accordingly, independent claims 11, 16, 18, 20 and 24 are not rendered obvious by the Fukushima and Kelly patents for at least this reason. Since claims 12, 13 and 15 depend from claim 11, since claims 17 and 30 depend from claim 16, since claims 21-23 depend, either directly or indirectly,

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from claim 20 and since claims 25-27 depend, either directly or indirectly, from claim 24, these claims are similarly not rendered obvious.

Finally, one skilled in the art would not have modified the Fukushima patent in view of the Kelly patent as proposed by the Examiner. First, the applicants respectfully note that the Fukushima patent concerns a router with redundant RCUs, and routing protocol operations performed (or not performed) by the RCUs, largely depending on whether they are in an active mode or a standby mode. On the other hand, the Kelly patent concerns gateways between telephone (PSTN) networks and Internet protocol (IP) networks, as well as address resolution. Although the Kelly patent mentions the possibility of providing redundant alternative equipment, as well as listing such redundant equipment and instructing when to use such redundant alternative equipment, it has nothing to do with redundant route calculating units in a given router. Thus, there is no suggestion to modify the Fukushima patent in view of the Kelly patent.

Second, and more importantly, the Examiner's rationale for combining the purported teachings of the Kelly patent into the Fukushima patent is that one skilled in the art would have modified the Fukushima patent so that it informed an external node of the identity of the designated routing facility "so that the external router knows which routing facility to use to route packets." Paper No. 10042005, page 6. However, the internal operation of the multiplex router in the Fukushima patent need not be transparent because the external nodes 30 do not need to know which of the RCUs

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is active and which is standby. Indeed, the active and standby RCUs apparently share the same IP address, as shown in Figure 3. To reiterate, column 8, lines 14-20 of the Fukushima patent state:

> Because the other routers 30 that received Hello packets from the route calculation unit 11b are periodically receiving Hello packets from the multiplex router 10, ***the other routers 30 do not regard the multiplex router 10 as having run into a failure nor do they rewrite the routing tables they hold***, even if the ID list of other routers included in received packets is incomplete. [Emphasis added

This passage clearly suggests that the external nodes 30 needn't be concerned with the internal workings (at least as far as which RCU is in the active mode and which is in the standby mode) of the multiplex router 10.

In the final Office Action, the Examiner argues:

> Even though Fukushima et al disclose that the external nodes do not need to know which of the RCUs is active and which is standby, this information will allow external nodes to know which networks it is connected to. Each route calculation unit 11a and 11b is connected to different networks. For example, after switchover to RCU 11b, hello packets contain "the identity of the networks connected to the route calculation unit 11b itself". Refer to Column 7, line 66 to Column 8, line 14.

Paper No. 20060522, page 15. The applicants respectfully disagree.

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Since RCUs 11a and 11b are contained in the same multiplex router 10, the networks to which the external nodes are connected will be independent of which RCU -- 11a or 11b -- is the active RCU. The example cited by the Examiner does not refute this. Rather, the cited passage merely discusses information gathered by the RCU 11b after it switches over to the active mode. It concerns information that needs to be learned by the RCU 11b, not information that needs to be learned by external routers. Indeed, just after the cited passage, the Fukushima patent states:

> Because the other routers 30 that received Hello packets from the route calculation unit 11b are periodically receiving Hello packets from the multiplex router 10, ***the other routers 30 do not regard the multiplex router 10 as having run into a failure nor do they rewrite the routing tables they hold***, even if the ID list of other routers included in received packets is incomplete. ***Therefore, even if a system switchover occurs, this does not affect the packet forwarding***. If other routers 30 receive an incomplete packet from the multiplex router 10, by regarding the multiplex router 10 as being in a faulty state, they manage the router state of the multiplex router 10, and perform a routing protocol process specified in OSPF to cope with that router state. ***As described earlier, when subsequently receiving a complete Hello packet from the multiplex router 10, the routers 30 return to the ordinary routing protocol process they executed before the system switchover occurred***. [Emphasis added.]

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Column 8, lines 14-30. Accordingly, the Examiner's rationale for combining the Kelly and Fukushima patents is unsupported and contrary to the teachings of the Fukushima patent.

Accordingly, independent claims 11, 16, 18, 20 and 24 are not rendered obvious by the Fukushima and Kelly patents for at least this additional reason. Since claims 12, 13 and 15 depend from claim 11, since claims 17 and 30 depend from claim 16, since claims 21-23 depend, either directly or indirectly, from claim 20 and since claims 25-27 depend, either directly or indirectly, from claim 24, these claims are similarly not rendered obvious.

Claim 14 stands rejected under 35 U.S.C. § 103 as being unpatentable over the Fukushima and Kelly patents in view of the Feldmann publication. The applicants respectfully request that the Examiner reconsider and withdraw this ground of rejection in view of the following.

Since the purported teaching of the Feldmann publication fails to compensate for the deficiencies of the Fukushima and Kelly patents with respect to claim 11 (discussed above), claim 14 is not rendered obvious by the Fukushima and Kelly patents in view of the Feldmann publication.

<u>Conclusion</u>

In view of the foregoing amendments and remarks, the applicant respectfully submits that the pending claims are in condition for allowance. Accordingly, the

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applicants request that the Examiner pass this application to issue.

Respectfully submitted,

March 20, 2006

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in which case reversing the search might discover a different one). The reason for searching backward is that each node is labeled with its predecessor rather than its successor. When copying the final path into the output variable, *path*, the path is thus reversed. By reversing the search, the two effects cancel, and the answer is produced in the correct order.

5.2.3. Flooding

Another static algorithm is **flooding**, in which every incoming packet is sent out on every outgoing line except the one it arrived on. Flooding obviously generates vast numbers of duplicate packets, in fact, an infinite number unless some measures are taken to damp the process. One such measure is to have a hop counter contained in the header of each packet, which is decremented at each hop, with the packet being discarded when the counter reaches zero. Ideally, the hop counter should be initialized to the length of the path from source to destination. If the sender does not know how long the path is, it can initialize the counter to the worst case, namely, the full diameter of the subnet.

An alternative technique for damming the flood is to keep track of which packets have been flooded, to avoid sending them out a second time. One way to achieve this goal is to have the source router put a sequence number in each packet it receives from its hosts. Each router then needs a list per source router telling which sequence numbers originating at that source have already been seen. If an incoming packet is on the list, it is not flooded.

To prevent the list from growing without bound, each list should be augmented by a counter, k, meaning that all sequence numbers through k have been seen. When a packet comes in, it is easy to check if the packet is a duplicate; if so, it is discarded. Furthermore, the full list below k is not needed, since k effectively summarizes it.

A variation of flooding that is slightly more practical is **selective flooding**. In this algorithm the routers do not send every incoming packet out on every line, only on those lines that are going approximately in the right direction. There is usually little point in sending a westbound packet on an eastbound line unless the topology is extremely peculiar.

Flooding is not practical in most applications, but it does have some uses. For example, in military applications, where large numbers of routers may be blown to bits at any instant, the tremendous robustness of flooding is highly desirable. In distributed database applications, it is sometimes necessary to update all the databases concurrently, in which case flooding can be useful. A third possible use of flooding is as a metric against which other routing algorithms can be compared. Flooding always chooses the shortest path, because it chooses every possible path in parallel. Consequently, no other algorithm can produce a shorter delay (if we ignore the overhead generated by the flooding process itself).

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